

Quality of Life and Smoking Status in Cancer Survivors Who Participated in MBME Classes

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Abstract

By 2024, there will be an estimated 18.9 million cancer survivors in the United States. Cancer survivorship is defined as the time period from cancer diagnosis through the remainder of life. Quality of life (QOL) is important to cancer survivors because they may have many side effects from their cancer and treatment that could decrease their satisfaction in their daily lives. Mind body movement exercise (MBME) such as yoga, Tai Chi, and Qigong, is a complementary health approach that can be vital in improving the overall health of cancer survivors. Smoking cessation may also increase cancer survivors' QOL and efficacy of treatment by decreasing mortality, treatment toxicity, infection, and risk for a second primary cancer. The purpose of this study was to describe QOL scores among cancer survivors who participated in MBME classes. This was a one group repeated measures design with cancer survivors who were enrolled in a 10 week MBME class. Data collection occurred at the time of enrollment and at 6 months after study completion. Participants were recruited from The James Cancer Hospital's *James Care for Life* MBME classes. QOL was measured with the FACT-G. There were 33 participants at baseline and 24 at 6 months; 8 with a smoking history for both time points. Patients without a smoking history had a mean (SD) FACT-G score of 77.41 (17.76) at baseline and 82.89 (20.97) at 6 months. Patients with a smoking history had a mean (SD) FACT-G score of 75.31 (15.95) at baseline and of 80.62(15.45) at 6 months. QOL scores for participants with a smoking history were slightly lower than those who were never smokers at both time points. This reinforces the importance of smoking cessation at every stage in cancer survivorship. Future research on the benefits of MBME with a smoking cessation intervention among cancer survivors is warranted.

Chapter I: Statement of the Problem

Introduction

By 2024, there will be an estimated 18.9 million cancer survivors in the United States; an increase from 14.5 million survivors in 2014 (American Cancer Society, 2014). This increase in cancer survivors is due to multiple factors (Siegel, DeSantis, Virgo et al., 2012). For example, the effectiveness of chemotherapy has improved. Life expectancy in the United States has increased to 78.8 years in 2013 from 70.8 years in 1970 (CDC, 2015). The risk of cancer increases throughout life until old age (Ukrainitseva & Yashin, 2003). Since the population is living longer, they have a greater chance of developing cancer. The screening tools for cancer have become more reliable and sensitive, allowing cancer to be diagnosed earlier and treated earlier.

Cancer survivorship is defined as the time period from diagnosis through the remainder of life. It can be described as having three phases: living *with* cancer, living *through* cancer, and living *beyond* cancer (NCI, n.d.). Living with cancer is the period of time surrounding diagnosis and treatment. Living through cancer is the time following treatment when the risk of reoccurring cancer is relatively strong. Living beyond cancer refers to the long term effects of cancer diagnosis and treatment. It is important to cancer survivors to have a high quality of life (QOL). Smoking cessation may also increase cancer survivors' QOL and efficacy of treatment by decreasing mortality, treatment toxicity, infection, and risk for a second primary cancer (Gritz, Toll, Warren, 2014).

Mind Body Movement Exercise (MBME) is a term used to describe therapeutic exercises, such as yoga, Tai Chi and Qigong and are considered complementary health approaches vital to the survivorship care plan (Mustian, Sprod, Janelins, et al., 2013; Sprod,

Fernandez, Janelins et al., 2015). MBME is a technique that has been used to improve physical and emotional health (Mustain et al., 2013; Sprod et al., 2015). Mind body movement decreases pain, stress, insomnia, and depression and increases coordination and gait speed. These interventions have been found to be beneficial for cancer survivors.

Yoga is a common stress reducing exercise and is known to reduce cancer-related fatigue as well as reduce pain (Sprod et al., 2015). Tai Chi, a form of martial arts and exercise, is known for slow, methodical movements with breathing and imagery with significant benefits to cancer patients (Wayne & Kaptchuk, 2008). Qigong involves coordinated, gentle physical exercises and relaxation through meditation and breathing and has been shown to improve QOL in cancer patients (Oh, Choi, Inamori, Rosenthal, & Yeung, 2013).

Study Aims

The purpose of this study was to investigate QOL among cancer survivors and to determine if smoking status as has an effect with cancer survivors' QOL. The research objectives were to:

- 1) Describe QOL scores among cancer survivors who participated in MBME classes.
- 2) Describe QOL scores between participants with a smoking history to participants without a smoking history.

Chapter II: Review of the Literature

There are many aspects of a patient's life that changes when they are diagnosed with cancer. Issues that cancer patients experience during survivorship include living with the lasting physical, emotional, spiritual, and financial consequences of a cancer diagnosis (CDC, 2014). Cancer survivors experience long term side effects of their disease and treatment. Due to these

side effects, survivors may worry about recurrence or developing a secondary cancer. Patients that are more likely to have fear of recurrence are younger in age, have poor coping skills, and have a poorer QOL than cancer survivors who did not have a fear of recurrence (Crist & Grunfeld, 2012).

The patient may have lasting side effects from their treatments, such as weakness or being easily fatigued. Patients may experience depression or another mood disorder during this time. All of these experiences may cause patients to have a difficult time getting their life back to normal or establishing a new normal (NCI, n.d.). In addition, a cancer diagnosis can affect personal relationships. A cancer survivor's family or friends may not know how to respond to the diagnosis and avoid the survivor, not want to talk about their illness, or change their behaviors towards the survivor (Wortman & Dunkel-Schetter, 1969). A patient may experience stronger spirituality or decreased spirituality in response to having cancer. Survivors may need counseling or funding to offset charges from their hospital stay and treatment. Economic hardship may also be something a patient experiences because of job loss of the survivor or caretaker, treatment costs, and treatment once the survivor is in remission. It is important to help the patient adjust to these changes so they can lead a healthy and productive life (CDC, 2014).

Treatment Related Side Effects

Survivors of cancer have many treatment and disease related side effects. Physical side effects can include pain, nausea, vomiting, diarrhea, constipation, anorexia, anemia, decreased immunity, lymphedema, and fatigue. Long term side effects can include: cataracts, infertility, skin changes, heart disease, lung disease, and increased risk of a secondary cancer (Mayo Clinic, 2014). Psychosocial side effects can include anxiety, depression, and worry. Throughout

treatment, the patients will have many medical appointments and may take many additional medications.

Fatigue

Many cancer survivors experience fatigue at some point during survivorship. Fatigue that is related to cancer is different than fatigue that is experienced by a non-cancer survivor. Cancer related fatigue is more severe, more distressing, and is less likely to be relieved with rest (REF). When cancer survivors experience fatigue, they are more likely to have problems sleeping, pain, and emotional issues (National Comprehensive Cancer Network, n.d.). Exercise and psychological interventions have been shown to be helpful in decreasing fatigue of cancer survivors (American Cancer Society, 2014).

Tobacco Use

Some cancer patients may wonder why they should stop smoking if they have received a diagnosis of cancer. Although the patient has already developed cancer, smoking cessation may increase their QOL and efficacy of treatment by decreasing mortality, toxicity, infection, and a risk for a second primary cancer (Gritz et al., 2014). Smoking cessation can also decrease pain levels. In a study by Daniel et al. (2009), lung cancer survivors who used tobacco were more likely to experience higher pain levels than patients that had quit smoking or had never smoked.

To increase the quality and duration of cancer survivorship, it is important that patients stop smoking. This can be a difficult task, and many patients may not have the resources to help them quit. Nicotine is a highly addictive component in cigarettes. When a patient uses a tobacco product, the nicotine activates a pathway in the brain when it binds to nicotinic receptors (Szamocki, 2013). When the nicotinic receptors are bound, dopamine is released. Dopamine is a neurotransmitter that is active in the reward pathway of the brain. When this pathway is

activated, a patient will experience feelings of pleasure. As the patient continues to use tobacco, they will have to use more tobacco every time to increase dopamine levels in their brain. If the patient does not use tobacco, they will begin to have withdrawal symptoms. Symptoms of withdrawal include: decreased heart rate, and increased caloric intake, craving for tobacco, confusion, depression and poor concentration (Hatsukami, Hughes, Pickens, & Svikis, 1984).

There are various medications that can be used to assist with smoking cessation. In order to reduce smoking craving and withdrawal symptoms, nicotine replacement therapy, bupropion, and varenicline can be used (Stead, Perera, Bullen et al., 2012). Nicotine replacement therapy stimulates the nicotinic receptors in the brain, just as using tobacco would (Molyneux, 2004). Varenicline works as an antagonist for the nicotinic receptors in the brain (Aubin, Luquiens, & Berlin, 2013).

Quality of Life

QOL is important to cancer survivors. Although cancer is a physical disease, it has lasting effects on the entirety of the patient's life. It is important to not only diagnose and treat a patient that has cancer, but to also ensure that they will have a good QOL after their diagnosis. QOL is a subjective measure that is based on a patient's perception of their life (Peplau, 1994). There are four aspects of QOL: physical, psychological, social, and spiritual (Ferrell, Hassey, & Grant, 1995). In a randomized control trial, breast cancer patients were assigned to yoga and a yoga waiting list for 12 weeks. Patients who participated in yoga for 12 weeks had higher QOL scores than patients who were in the control group (Cohen, 2007). In patients with advanced gastric cancer, those who received chemotherapy had higher QOL scores than patients who only received supportive care (Thigpen, 1997). Breast cancer survivors who were diagnosed at an older age (>65) had a lower physical QOL score than survivors diagnosed when they were

younger than 65. Breast cancer survivors who were diagnosed at a younger age had a lower social QOL than those survivors who were older than 65. In colorectal cancer survivors, women were found to have more psychological and social QOL issues than men (Grant, McMullen, Altschuler et al., 2011). In a randomized control trial with cancer patients, patients who did not have depression had a much higher QOL than patients who had depression (Brown, Kroenke, Theobald, Wu, & Tu, 2009). Cancer patients who continued to smoke after diagnosis had a lower QOL than cancer patients who quit smoking or did not have a smoking history (Hanna, 2004).

Physical Changes to the body

There are many physical effects after cancer treatment. These changes may be from the treatment (e.g. surgery, chemotherapy, or radiation), from the cancer. Some common issues are: infertility issues, weight loss, sexual dysfunction, pain, learning problems, incontinence, endocrine changes, dental changes, and secondary cancers (MDAnderson, n.d.). Patients may have hair loss, scars, loss of a body part, and pain (Coping with Changes to your Body, 2012).

Depression

Patients may experience grief and sadness when they are diagnosed and throughout their treatment, this reaction is normal. Many patients do accept and adapt to their diagnosis of cancer. However, 25% of cancer patients will develop depression during their treatment (National Cancer Institute, 2014). Cancer patients develop depression around the same rates that patients with illnesses that make them similarly ill (Spiegel & Giese-Davis, 2003). For a patient to be diagnosed with depression, they must experience either a depressed mood or lack of interest in regular activities for at least two weeks. They must also exhibit at least four other depressive symptoms: fatigue, decreased appetite, problems sleeping, altered memory or concentration, suicidal ideation, and feelings of hopelessness, helplessness, guilt, and worthlessness. Although

many of these symptoms can also be a result of cancer or treatment, depressive symptoms can extend further than what would just be from the cancer or treatment (Chochinov, 2001). There are many risk factors for developing depression for patients with cancer. History of depression, family history of depression, poorly controlled pain, history of drug or alcohol abuse, other medical conditions, and certain types of cancers increased the likelihood that the patient will develop depression (Chochinov, 2001). Depression in cancer patients is treated in a number of ways. Most often, the patients will receive a combination of therapies. Typically, patients are prescribed a medication and will also receive psychotherapy (Li, Fitzgerald, & Rodin, 2012).

Social Support

Patients may experience a change in social support and relationships due to a change in patient role (Cancer.net, 2014). A survivor who had previously been the primary caretaker for his family may have to take a less active role. The survivor's spouse may have to become the primary caretaker for the family, when they previously had not done so. Patients will have many follow up appointments to monitor their cancer status and to treat the side effects. This causes survivors to rely on others for transportation to appointments. All of these social changes can put stress on the survivor and his family.

Chapter III: Methodology

Design

This study is a one group repeated measures design. Participants were enrolled in a mind body movement class for 10 weeks. Data collection occurred at the time of enrollment (baseline), 5 weeks, and 10 weeks and at 6 months after conclusion of the MBME class. This paper will only report data from the baseline and 6-month data points.

Population Sample

Participants for this study were recruited from The Ohio State University Wexner Medical Center-James Cancer Hospital's *James Care for Life* mind body movement classes (e.g. yoga, Tai Chi, Qigong). These classes were offered free of charge to cancer survivors and caregivers of cancer survivors. Cancer survivors did not need to participate in order for their caregiver to participate in any of the classes. Survivors and caregivers did not need to participate in the class at the same time. This paper will only report data from survivors. The class sessions lasted for 10 weeks and sessions were offered four times a year. Classes were offered in multiple locations throughout the Columbus metropolitan area, including iResolve fitness club (adjacent to downtown Columbus, Ohio), Stoneridge Medical Center (Dublin, Ohio), and the Stephanie Spielman Comprehensive Breast Center (Columbus, Ohio).

Inclusion Criteria

Patients were 18 years or older, could read or speak English, had a diagnosis of cancer, provided informed consent, and were enrolled in yoga, Tai Chi, or Qigong.

Data Collection Procedures

Potential participants were contacted before the first class of the session by the JCFL staff to inform them about the study and asked that they come early to the first session if they would like to participate. Survivors were also invited to participate prior to the first class of the session. Interested participants then provided informed consent before enrollment. Participants completed study questionnaires prior to class on the first class (i.e., baseline). At 6 months after program completion, participants were mailed a study questionnaire to complete and a \$10 incentive card. Questionnaires for baseline and 6 months after program completion were identical.

Data Collection Instruments

Measures that were collected in this study were: 1) socio-demographic; 2) health history (primary cancer, self-reported health status); 3) tobacco history; and 5) QOL (FACT-G). Socio-demographic data included age, gender, race and ethnic background, annual household income, education level, employment status. Health history included type of cancer primary, self-reported health status in general and self-reported health status now, compared to 1 year ago. Tobacco history included two categories: never smoker and current or former smoker. QOL was measured by the Functional Assessment of Cancer Therapy-General (FACT-G) (Winstead-Fry & Schultz, 1997).

The FACT-G is a 27-item self-assessment tool that assesses QOL in patients with any type of cancer. It has good reliability with an internal consistency score for the overall scale is 0.89 (Winstead-Fry & Schultz, 1997). There are four categories of questions (i.e., physical, social/family, emotional, and functional well-being). There are 5 item responses ranging from “not at all” to “very much” (0-4). A higher score corresponds to a better QOL (Winstead-Fry & Schultz, 1977). There is an overall sum score with a range of 0-108. Each category has a sum score; (e.g., 0-28 for the physical, social/family, and functional scales and 0-24 for the emotional scale).

Data Analysis

All data was analyzed with means, standard deviations, and percentages. All data analysis was performed in SPSS. Descriptive statistics were calculated to describe the sample. All analyses were conducted in SPSS 23 (IBM).

Chapter IV: Results

There were 33 participants who enrolled in the study at baseline and 24 participants at 6 months. Over half of the participants were women. The mean age of the participants was 60 years old. The majority of the participants were Non-Hispanic white. Over half of the participants listed breast cancer as their primary cancer. Most participants were college educated and had a household income of over \$50,000. The majority of participants described their health status as the same as or better than a year ago (See Table 1 for all Baseline Sample Characteristics). Eight participants had a smoking history; seven participants had smoked in the past and currently did not smoke and one participant currently smoked. Although health status between past smokers and current smoker is different, past smokers and current smokers' health status is more similar than participants without any smoking history.

Table 1: Baseline Sample Characteristics (n=33)

Variables	N	%	Mean (SD)
Age	32		60 (7.93)
Gender			
Male	5	15.2	
Female	28	84.8	
Race/Ethnicity			
Non-Hispanic White	27	81.8	
African American	3	9.1	
Asian-American/ Pacific Islander	3	9.1	

Table 1: Baseline Sample Characteristics (n=33) (Con't)

Variables	N	%	Mean (SD)
Highest Level of Education Completed (n=31)			
GED	1	3	
High School Diploma	2	6.1	
Some College or Technical School	3	9.1	
College or University Degree	25	75.8	
Type of Primary Cancer (n=33)			
Breast	17	51.5	
Hematologic	7	21.2	
Other solid tumor	9	27.3	
Current Employment Status (n=30)			
Employed for wages full-time	5	15.2	
Employed for wages part-time	2	6.1	
Homemaker	1	3	
Self employed	4	12.1	
Retired	12	36.4	
Out of work for more than 1 year	3	9.1	
Disabled	3	9.2	
Health Status in General (n=31)			
Excellent	3	9.1	
Very Good	7	21.2	
Good	16	48.5	
Fair	5	15.2	
Participant Smoking History (n=33)			
Never	25	75.8	
Former smoker/current smoker	8	24.2	
Class and Location (n=33)			
Yoga	20	60.6	
Qigong	4	12.1	
Tai Chi	9	27.3	

At baseline participants who were never smokers had a QOL score of 77.41 while participants with a smoking history had a QOL score of 75.31(See Table 2 for FACT-G Scores by Smoking Status). At 6 months, participants who were never smokers had a QOL score of 84.41 and participants with a smoking history had a QOL score of 84.06. Most of the participant QOL subscale scores increased from baseline to 6 months. QOL (Total FACT-G) increased from baseline to 6 months for participants in both smoking groups. In general, never smokers had a higher (better) QOL than participants with a smoking history.

Table 2: FACT-G Scores by Smoking Status

Sub-scale* (range)	Never (n=22)	Current/Former (n=8)	Never (n=16)	Current/Former (n=8)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
PWB (0-28)	22.2 (5.30)	19.4 (5.48)	22.1 (5.43)	23.9 (4.67)
SWB (0-28)	20.3 (5.49)	20.2 (4.18)	21.1 (6.74)	19.6 (4.31)
EWB (0-24)	17.1 (4.21)	18.4 (3.89)	19.4 (4.92)	17.3 (4.13)
FWB (0-28)	17.8 (6.67)	18.2 (5.59)	20.3 (6.60)	19.9 (6.08)
FACT-G (0-108)	77.4 (17.76)	75.3 (15.95)	82.9 (20.98)	80.6 (15.44)
PWB (0-28)	22.2 (5.30)	19.4 (5.48)	22.1 (5.43)	23.9 (4.67)

#Higher score indicates a better QOL

*PWB= Physical scale, SWB= Social/Family scale, EWB= Emotional scale, FWB= Functional scale

Chapter V: Conclusion and Recommendation

The purpose of this study was to compare QOL and smoking status among cancer survivors who participated in MBME classes (yoga, Tai Chi, Qigong). In general, most QOL scores for participants increased from baseline to 6 months after program completion. Overall QOL scores improved from baseline to 6 months for all participants. These findings are consistent with Oken et al.'s randomized control trial for seniors who participated in either a yoga class, walking exercise class or control group (Oken, Zajdel, Kishiyama, et al. 2006). In this trial, participants who participated in the yoga class had a significant improvement in their QOL when compared to the walking exercise and control groups.

Never smokers had a higher or better QOL than participants with a smoking history. This is similar to findings from Sarna et al. (2008). In this study, smokers had the lowest QOL in comparison to former and never smokers. Increased numbers of cigarettes per day and fewer days since quitting were correlated with decreased QOL (Sarna, Bialous, Cooley, Jun, & Feskanich, 2008).

Limitations

A limitation of this study included the small number of participants. This study only included participants who self-selected to enroll in MBME classes and did not include participants who did not have access to classes due to transportation, scheduling/timing/location logistics, or were too ill to participate. Also, this study enrolled caregivers who participated in the MBME classes, however, there were too few participants ($n = 8$) to report data.

Future Recommendations

Future recommendations would be to include caregivers in the research study and create a multicenter project to obtain more data. These observations reinforce the importance of smoking

cessation at every stage in cancer survivorship. Recommendations for future research include examining the benefits of MBME with a smoking cessation intervention among cancer survivors who smoke.

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